



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/077,029	05/18/1998	MUTSUMI KIMURA	JAO40499	5555
25944	7590	08/09/2005	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			SCHECHTER, ANDREW M	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/077,029

Applicant(s)

KIMURA ET AL.

Examiner

Andrew Schechter

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,9-19,32,51,54-56,58,60-64 and 66-104 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) 15,74,87,90,92,94 and 101-104 is/are allowed.
6) ☒ Claim(s) See Continuation Sheet is/are rejected.
7) ☒ Claim(s) 69-71,96,97 and 99 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/10/05, 4/29/05
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: IDS 5/25/05, 6/15/05.

Continuation of Disposition of Claims: Claims rejected are 1,3,4,9-14,16-19,32,51,54-56,58,60-64,66-68,72,73,75-86,88,89,91,93,95,98 and 100.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 3, 12-14, 16, 17, 75, 84, and 88 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 16 and 88 recite "the liquid optical material" in the last line, while previously reciting "one of an optical material and a liquid precursor". Thus, it is unclear whether the optical material must be liquid, and when d_a is measured. For examining purposes, it is assumed that "the optical material" is intended in the last line, and if a liquid precursor is used, then its thickness is measured after it has solidified into the optical material.

Claims 3, 12-14, 17, 75, and 84 depend on claim 16, and an analogous confusion exists for claim 17.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Art Unit: 2871

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 4, 9, 10, 19, 51, 54-56, 58, 61-64, 73, 78-83, 85, 89, 91, and 93 are rejected under 35 U.S.C. 102(b) as being anticipated by *Luo et al.*, U.S. Patent No. 4,135,959.

Luo discloses [see Figs. 2 and 4, for instance] a display device comprising a display substrate [12], projections [36] on the display substrate, which form a difference in height between the projections and the peripheries of the projections, and an optical material [38] arranged on the projections. Claim 1 is therefore anticipated.

There are features [16, 20, etc.] that surround the optical material, formed by wiring and including at least one bus line and a scanning or signal line, so claims 58 and 78-80 are also anticipated. There are TFT switching elements [T1], so claims 56 and 81 are also anticipated. The device is an electro-luminescent device, so claim 91 is also anticipated.

Considering the recited features to be the wiring [16, 20, 32] combined with the insulating layer [36], the features include wiring and form a difference in height, and there is an optical material arranged at predetermined positions defined by the features on the display substrate, so claim 61 is also anticipated. The predetermined positions are the peripheries of the features (above the electrode [34]), which are lower than the features themselves, so claim 51 is also anticipated. There are TFT switching

elements, so claims 62 and 63 are also anticipated. The features are projections which surround the optical material, so claim 64 is also anticipated. The wiring includes a bus line and a scanning or signal line, so claims 82 and 83 are also anticipated. The device is an electro-luminescent device, so claim 93 is also anticipated.

As above, *Luo* discloses a method of manufacturing a display device, the method comprising the steps of forming projections on a display substrate so as to form a difference in height between the projections and the peripheries of projections, and applying an optical material to the surface where the projections are formed, so claim 4 is also anticipated. There are TFT switching elements, so claims 54 and 55 are also anticipated. It is a method of making an electro-luminescent device, so claim 85 is also anticipated. At some applied electric field strength E_t (equivalently at some voltage $V_t = E_t \times d_f$) the optical material begins to give off light, which is a change in its optical properties; a driving voltage V_d in excess of this is used to produce increased brightness [col. 5, lines 41-43], so $V_d > V_t$ or $V_d / d_f > E_t$, so claims 19 and 89 are also anticipated.

Considering the recited features to be the wiring combined with the insulating layer as in claim 61, claim 73 is also anticipated. The wiring includes bus lines and signal or scanning lines, so claims 9 and 10 are also anticipated.

5. Claims 1, 4, 12, 14, 16, 19, 88, 89, and 91 are rejected under 35 U.S.C. 102(b) as being anticipated by *Tang et al.*, U.S. Patent No. 5,294,870.

Tang discloses [see Fig. 2, for instance] a display device comprising a display substrate [105], projections [107] forming a height difference, and optical material [EL] arranged on the projections. Claim 1 is therefore anticipated. It is an electro-

luminescent device, so claim 91 is also anticipated. The method is disclosed, so claim 4 is also anticipated. The height d_r of the features (the projections) and the thickness of the optical material d_a satisfy $d_a < d_r$, so claims 16 and 88 are also anticipated. The features include an interlayer insulation film, so claim 12 is also anticipated. The features are made by applying a material in liquid followed by removal of a part of the material [col. 5, lines 35-45], so claim 14 is also anticipated. A driving voltage with $V_d / d_f > E_t$ will be applied in order to produce bright light, so claims 19 and 89 are also anticipated.

6. Claims 4, 18, 19, 51, 54, 55, 61-64, 67, 82, 83, 89, and 93 are rejected under 35 U.S.C. 102(e) as being anticipated by *Nagayama et al.*, U.S. Patent No. 5,742,129.

Nagayama discloses [see Figs. 2 and 3, for instance] a display device comprising a features [3, 4, 7] including wiring [3, 4] and forming a height difference, and optical material [8] at predetermined positions. Claim 61 is therefore anticipated. The predetermined positions are lower than the features, so claim 51 is also anticipated. There are TFT switching elements, so claims 62 and 63 are also anticipated. The features are projections which surround the optical material, so claim 64 is also anticipated. The wiring includes bus lines and scanning and signal lines, so claims 82 and 83 are also anticipated. It is an electro-luminescent device, so claim 93 is also anticipated.

The method of forming projections and applying an optical material is disclosed, so claim 4 is also anticipated. There are TFT switching elements, so claims 54 and 55 are also anticipated. There is a step of forming an interlayer [9] so that part of the

Art Unit: 2871

projections is covered, so claim 67 is also anticipated. A driving voltage with $V_d / d_f > E_t$ will be applied in order to produce bright light, so claims 19 and 89 are also anticipated. The thickness d_f is equal to the height of the surface features d_r , so claim 18 is also anticipated.

7. Claims 4, 32, 60, 66, 68, 72, 95, 98 are rejected under 35 U.S.C. 102(b) as being anticipated by *Ogata*, Japanese Patent Document No. 59-75205 (made of record by the applicant).

Ogata discloses a method of manufacturing a display device comprising forming projections [2] on a display substrate [1] and applying an optical material [5, 6, 7, etc.]. Claim 4 is therefore anticipated. The features [2] have a substantially different repellency [see abstract] from the peripheries of the projections, and optical material is applied at the predetermined positions, so claim 68 is also anticipated. The projections are less repellent to the optical material compared to the peripheries of the projections, so claim 72 is also anticipated. Lyophilicity is a relative quantity, so having the projections be less repellent is the same as enhancing a lyophilicity at the predetermined positions relative to a lyophilicity of peripheries of those positions, so claims 32 and 98 are also anticipated. Ink jet is used to apply the optical material [see abstract], so claims 66 and 95 are also anticipated. In addition, there is a substrate [1], so claim 60 is also anticipated.

8. Claims 1, 4, 11, 54, 55, 67, 76, and 77 are rejected under 35 U.S.C. 102(e) as being anticipated by *Yoshida et al.*, U.S. Patent No. 5,734,455.

Yoshida discloses [see Fig. 5, for instance] a display device comprising a display substrate [11], projections [213] on the display substrate, forming a height difference, and an optical material [26] arranged on the projections. Claim 1 is therefore anticipated. The projections are formed by pixel electrodes, so claim 76 is also anticipated. There is an interlayer [23] which covers part of the projections, so claim 77 is also anticipated. The method of making this is disclosed, so claims 4, 11, and 67 are also anticipated. There are TFT switching elements, so claims 54 and 55 are also anticipated.

9. Claims 4, 32, 68, 98, and 100 are rejected under 35 U.S.C. 102(b) as being anticipated by *Yoshikawa et al.*, Japanese Patent Document No. 08-179113 (made of record by the applicant).

Yoshikawa discloses a display device comprising a substrate [1], features [2, 7] that form a height difference, and an optical material [8] arranged at predetermined positions, repellency of the wall and top of the features being substantially different (due to the films [7], see abstract). Claim 100 is therefore anticipated. Similarly, claims 4, 32, 68, and 98 are anticipated.

10. Claims 4, 16, 19, 88, and 89 are rejected under 35 U.S.C. 102(e) as being anticipated by *Takahashi et al.*, U.S. Patent No. 5,804,917.

Takahashi discloses [see Fig. 2] a method of making an electro-luminescence display device comprising forming features [8] so as to form a height difference, and applying an optical material [6] at predetermined positions, where the height of the features is larger than the height of the optical material. Claims 16 and 88 are therefore

anticipated. The features are projections, so claim 4 is also anticipated. The relation $V_d / d_f > E_t$ is satisfied when the light intensity is increased above a minimum value, so claims 19 and 89 are also anticipated.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Tang et al.*, U.S. Patent No. 5,294,870 as applied to claim 16 above, in view of *Eida et al.*, U.S. Patent No. 5,909,081.

Tang does not disclose that the features include a light shielding layer. *Eida* discloses [see Fig. 13] an analogous EL device with a light shielding layer between the EL pixels (where the features in *Tang* are located), and teaches that this improves the visibility of multi-color light emission [col. 24, lines 26-30]. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to make the features include a light shielding layer, motivated by this teaching of *Eida* (and the efficiency of having the features be dual-purpose rather than having to form a separate light shield). Claim 13 is therefore unpatentable.

13. Claims 66, 84, and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Takahashi et al.*, U.S. Patent No. 5,804,917 as applied above, in view of *Bradley, Jr. et al.*, U.S. Patent No. 5,824,374.

Takahashi discloses applying the optical material by “a wet process, which is practiced by doctor blade techniques, dipping, spinner application, roll coating, spraying, screen printing or the like” [col. 7, lines 12-14], but does not explicitly mention ink jet printing. *Bradley* is evidence that ink jet printing, roller coating, spray coating, spin coating, and screen printing are art-recognized equivalents [col. 18, lines 37-40]. It would have been obvious to one of ordinary skill in the art at the time of the invention to use ink jet printing in place of one of the others listed, motivated by the equivalency of the various techniques. Claims 66, 84, and 86 are therefore unpatentable.

Allowable Subject Matter

14. Claim 69-71, 96, 97, 99 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. Claims 3, 17, 75, would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

16. Claim 15, 74, 87, 90, 92, 94, and 101-104 are allowed.

17. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the method of claim 3, in particular making a display device having the features being recesses less repellent compared to the peripheries, and the thickness of the optical material less than the depth of the recess. (The prior art color filters having the repellency characteristic all disclose having the optical material equal to or greater than the depth of the recess; the prior art EL devices with the thickness property do not disclose the repellency property.) Claim 3 would therefore be allowable if rewritten appropriately. Similarly, claim 75 recites a repellency limitation, so for the same reasons it would be allowable if rewritten appropriately.

The prior art does not disclose the method of claim 17, in particular that the recited inequality is satisfied. Claim 17 would therefore be allowable if rewritten appropriately.

The prior art does not disclose the device of claim 15, in particular the limitations of forming features with substantially different repellency and forming a height difference and predetermined positions on a peeling layer, applying an optical material to the surface at those positions, and transferring the layer to a display substrate. Claim 15 is therefore allowed, as is claim 74 which depends on it. Similarly, claim 87 is allowed.

The prior art does not disclose the device of claim 69, in particular the limitation that the features having substantially different repellency are formed by wiring. Claim 69 would therefore be allowable if rewritten appropriately, as would claims 70 and 71 which depend on it.

The prior art does not disclose the method of claim 90, in particular an EL device with features giving a height difference and enhancing lyophilicity at predetermined

Art Unit: 2871

positions defined by the features compared to the peripheries, so claim 90 is allowed.

Similarly, the prior art does not disclose the device of claim 92, in particular an EL device with features giving a height difference and having substantially different repellency at predetermined positions defined by the features compared to the peripheries, so claim 92 is allowed.

Similarly, the prior art does not disclose the method of claim 97, in particular having features giving a height difference and having different repellency at predetermined positions defined by the features compared to the peripheries, when the inequality $V_d / d_f > E_t$ is satisfied (this is not satisfied by color filters, for instance). Claim 97 would therefore be allowable if rewritten appropriately.

The prior art does not disclose the device of claim 94, in particular having features comprising pixel electrodes which have substantially different repellency from their peripheries, form a height difference, and have optical material applied by ink jet. Claim 94 is therefore allowed.

The prior art does not disclose the device of claim 96, in particular the limitations that the features are formed by wiring to form a height difference (as opposed to being a light shield, for instance) and the optical material is applied by ink jet. Claim 96 would therefore be allowable if rewritten appropriately.

The prior art does not disclose the device of claim 99, in particular the limitations that the features are formed by wiring to form a height difference (as opposed to being a light shield, for instance) and also has a different repellency. Claim 99 would therefore be allowable if rewritten appropriately.

The prior art does not disclose the method of claims 101 or 103, in particular the limitations of forming pixel electrodes and an insulating layer, enhancing the insulating layer's repellency, and patterning it to expose part of the pixel electrodes. Claims 101 and 103 are therefore allowed, as are claims 102 and 104 which depends from them.

Election/Restrictions

18. The applicant's election with traverse in the response of 4 April 2005 is noted. The traversal is on the grounds that there is not a significant burden to the examiner. At this point the examiner agrees with this argument, and withdraws the previous restriction requirement.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

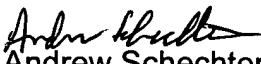
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Andrew Schechter
Primary Examiner
Technology Center 2800
4 August 2005